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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/506,386	09/02/2004	Marc Bednarz,	P/4600-2	1647

7590
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04/24/2007

EXAMINER

WANG, EUGENIA

ART UNIT	PAPER NUMBER
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1745

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/506,386

Applicant(s)

BEDNARZ ET AL.

Examiner

Eugenia Wang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-22 is/are pending in the application.
- 4a) Of the above claim(s) 14-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 10-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/2/04 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 9/2/04.
- 4) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date. 4/02/07.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 10-13, drawn to a method of inerting.

Group II, claim(s) 15-22, drawn to a fuel cell system.

2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Group I's special technical feature is inerting with water vapor. Group II's special technical feature is the combination of the method of inerting with the use of a fuel cell. (Group I's recitation for a fuel cell is perceived as intended use, as the inerting method could be used in other electrochemical devices, such as an electrolyzer.)

3. During a telephone conversation with Klaus Stoffel on April 2, 2007 a provisional election was made without traverse to prosecute the invention of Group I, claims 10-13. Affirmation of this election must be made by applicant in replying to this Office action. Claims 15-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Priority

5. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

6. The information disclosure statement filed September 2, 2004 has been placed in the application file and the information referred to therein has been considered as to the merits.

7. Only the abstracts of the foreign pieces listed on the IDS has been considered to the merits. Examiner invites Applicant to submit a translation for the body of those aforementioned pieces.

8. The list of references in the specification (that is not included with the IDS) is not a formal IDS. Examiner invites Applicant to submit a formal IDS if Applicant would like those pieces to be considered.

Drawings

9. The drawings are objected to because it (a) is not properly labeled ('figure' misspelled and no number included) and (b) seems unconventional, undefined terms. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to

the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

10. The amendment to the disclosure made on September 2, 2004 has been considered.

11. The disclosure is objected to because of the following informalities: (a) the first page of the specification is duplicated and (b) in light of the required drawing correction, the specification must refer to the drawing by its appropriate name as well.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by US 5492777 (Isenberg et al.).

As to claim 10, Isenberg et al. teaches a solid oxide fuel cell with two modes: an energy storage mode and an energy recovery mode (col. 4, lines 11-14). The energy storage mode entails applying an electrical energy and feeding H₂O (steam) to the electrolysis cathode (also fuel anode, see * for explanation below) (col. 4, lines 14-30). The energy recovery mode includes providing H₂ gas to the fuel anode of the fuel cell in order to produce electrical energy (col. 4, lines 30-47). Isenberg et al.'s energy storage mode, therefore inherently inerts the anodes of the fuel cell, since it applies the process of claim 10.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

In the case of the instant application the basis for expectation of inherency is that Isenberg et al.'s method uses steps employed by the instant application. Therefore, the resulting state of the anodes would be in the same state (inert) after the application of the same method.

The Examiner requires applicant to provide that that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product.

Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

*The definition of cathode and anode used by Isenberg et al. differs with respect to the mode it is operating in. The electrolysis cathode is equated to the fuel anode (col. 5, lines 52-58).

14. Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by US 3544374 (Alessandro et al.).

As to claim 10, Alessandro et al. teaches a method to prevent corrosion of hydrogen permeable membranes in anodes (col. 2, lines 27-31). The method comprises applying a direct current potential between the cathode and anode of the fuel cell, thus reducing it with respect to the cathode (col. 2, lines 45-51). Furthermore, corrosion prevention is achieved by removing hydrogen from the membrane, where

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hydrogen removal can be achieved by flushing the membrane with an inert gas, including nitrogen, carbon dioxide, flue gas, argon, and **steam** (col. 2, lines 51-70). In addition, it is said that steam is used to purge all of the hydrogen from the vicinity of the membrane (col. 2, lines 70-72; col. 3, lines 1-7). Flushing the anode membrane and applying the direct current would inherently yield the anodes inert, since the applies the same process as claim 10 of the instant application.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

In the case of the instant application the basis for expectation of inherency is that Alessandro et al.'s method uses steps employed by the instant application. Therefore, the resulting state of the anodes would be in the same state (inert) after the application of the same method.

The Examiner requires applicant to provide that that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product.

Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to

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product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

Claim Rejections - 35 USC § 102/103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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16. Claims 11-13 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Alessandro.

The teachings of Alessandro et al. have been previously discussed and are herein incorporated.

As to claim 11, Alessandro et al. teaches flushing the anode membrane with an inert gas including nitrogen, **carbon dioxide**, flue gas, argon, and steam prior to steam treatment (col. 2, lines 51-72; col. 3, lines 1-7). Therefore supplying CO₂ as the inert gas prior to steam is one embodiment of Alessandro et al. See the drawing for evidence that inert gas and steam are used for the flushing (via valves [31] and [26], respectively).

Alternately, it would have been obvious to choose carbon dioxide as the inert gas, as it is one of the inert gases listed in a short laundry list of inert gases that can be used for flushing, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

As to claims 12 and 13, Alessandro et al.'s method teaches that the inert gas (the embodiment where carbon dioxide is used is chosen) is introduced and is followed by a steam purging (col. 2, lines 51-72; col. 3, lines 1-7). Therefore carbon dioxide is providing the initial inerting. After it is used to flush, steam flushing follows it. Thus it can be interpreted that the carbon dioxide is reduced (to zero) prior to steam flushing.

Alternately, it can be interpreted that both carbon dioxide and steam are flowing at the same time (after the steam is introduced). However, there is motivation to reduce

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the carbon dioxide flow once steam flow is introduced; the motivation is to accommodate the space that needs flushing. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to lower the carbon dioxide flow once steam is introduced in order to have the correct flow as to not overflow the anode chamber while inerting.

17. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isenberg et al., as applied to claim 11, in further view of US 3544373 (Alessandro et al) as evidenced by the Fuel Cell Handbook.

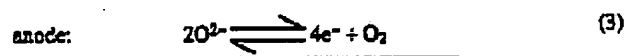
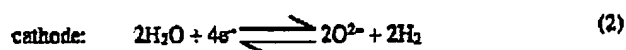
As to claim 11, Isenberg et al. does not teach supplying CO₂ to the anodes in addition to water vapor. However, Alessandro et al. teaches that removal of hydrogen via current application and flushing can from an anode during shut down and start up can keep the membrane from being corroded, where steam and CO₂ are exemplified as inert gases that can be used for flushing (col. 2, lines 45-70). It would have been obvious at the time the invention was made to use CO₂ in addition to steam, as it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Furthermore, there would have been further reason to use CO₂ to flush the system. The Handbook of Fuel Cells shows that solid oxide cells (the object of Isenberg et al.'s teaching; abs., lines 3-4) runs on carbon monoxide and methane, which is not mentioned in Isenberg et al.'s teaching (table 2-1). As CO₂ is a byproduct of the anode reaction for these two sides, the motivation for using CO₂ would be to not waste the

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byproduct. Therefore it would have further been obvious to one having ordinary skill in the art at the time the claimed invention was made to use CO₂ in addition to steam in order not to waste a byproduct that can be formed in solid oxide fuel cells.

As to claims 12 and 13, neither Isenberg et al. nor Alessandro et al. teach first mainly supplying CO₂ for immediate inerting of the anodes and then reducing that amount and providing more water vapor afterwards. However, motivation exists for doing so. By first inerting with the CO₂ byproduct (as taught by Alessandro et al.), more steam (also a byproduct) is consequently left for the electrolysis reaction as outlined by Isenberg et al.



(see col. 6, lines 44-53)

By leaving more steam to undergo the electrolysis reaction allows for more fuel to be generated for use in the fuel cell during Isenberg et al.'s energy recovery mode. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to first input CO₂ at a higher amount in order to initially inert in order to allow more water vapor to be utilized in hydrogen fuel production.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugenia Wang whose telephone number is 571-272-4942. The examiner can normally be reached on 8 - 4:30 Mon. - Fri., EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

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GREGG CANTELMO
PRIMARY EXAMINER

EW